

Claims

[c1] 1. A conveyor comprising:

a first conveyor belt running along a conveying path at a first velocity in a conveyance direction and extending transverse to the conveyance direction from a first side to a second side;
wherein the first conveyor belt includes a plurality of article-supporting rollers arranged to direct supported articles toward the first side of the first conveyor belt as the first conveyor belt runs in the conveyance direction;
a second belt arranged to run at a second velocity parallel to the first conveyor belt proximate the second side of the first conveyor belt; and
wherein the first velocity in the conveyance direction is greater than the second velocity in the conveyance direction so that the difference between the first velocity and the second velocity causes articles on the first conveyor belt extending past the second side of the first conveyor belt conveyor belt and into contact with the second belt to rotate.

[c2] 2. A conveyor as in claim 1 further comprising:

a registration surface disposed at the first side of the first conveyor belt against which articles directed toward the first side of the first conveyor belt are registered as the belt runs.

- [c3] 3. A conveyor as in claim 2 wherein the registration surface comprises a rail that includes article-engaging rollers that rotate about vertical axes.
- [c4] 4. A conveyor as in claim 2 wherein the registration surface is disposed parallel to the conveyance direction.
- [c5] 5. A conveyor as in claim 1 wherein the second belt includes spaced apart flights that contact articles extending from the first conveyor belt past its second side.
- [c6] 6. A conveyor as in claim 1 wherein the second belt includes upstanding members that contact articles extending from the first conveyor belt past its second side.
- [c7] 7. A conveyor as in claim 1 wherein the second belt includes a high-friction surface that frictionally contacts articles extending from the first conveyor belt past its second side.
- [c8] 8. A conveyor as in claim 1 wherein the first conveyor belt and the second belt run in opposite directions.
- [c9] 9. A conveyor as in claim 1 wherein the first conveyor

belt and the second belt run in the same direction.

- [c10] 10. A conveyor as in claim 1 further comprising bearing surfaces disposed beneath the first conveyor belt and wherein salient portions of the rollers extend below the first conveyor belt to ride on the bearing surfaces in rolling contact.
- [c11] 11. A conveyor as in claim 1 wherein the rollers rotate about axes oblique to the conveyance direction.
- [c12] 12. A conveyor as in claim 1 wherein the first conveyor belt and the second belt are substantially coplanar.
- [c13] 13. A conveyor as in claim 1 wherein the second belt is in a plane perpendicular to the plane of the first conveyor belt.
- [c14] 14. A conveyor for orienting and registering conveyed articles, the conveyor comprising:
 - a conveyor belt advancing along a conveying path in a conveyance direction from an upstream end to a downstream end and extending transversely from a first side to a second side and including article-supporting rollers arranged to direct supported articles toward the first side of the conveyor belt;
 - a registration surface disposed at the first side of the conveyor belt at its downstream end against which

conveyed articles are registered; orientation means disposed proximate the second side of the conveyor belt for engaging portions of articles conveyed on the conveyor in an original orientation relative to the conveyance direction and that extend outward past the second side of the conveyor belt and for impeding the progress of the extending portion in the conveyance direction and causing the extending portion to move onto the conveyor belt in a different orientation.

- [c15] 15. A conveyor as in claim 14 wherein the orientation means comprises a second belt running in a direction opposite to the conveyance direction.
- [c16] 16. A conveyor as in claim 14 wherein the orientation means comprises a plurality of upstanding members spaced apart in the conveyance direction.
- [c17] 17. A conveyor as in claim 14 wherein the orientation means comprises a horizontal surface topped with a high-friction material.
- [c18] 18. A conveyor as in claim 14 wherein the orientation means comprises a second belt running in a plane perpendicular to the plane of the conveyor belt.
- [c19] 19. A conveyor as in claim 14 wherein the orientation

means comprises a second belt substantially coplanar with the conveyor belt.

- [c20] 20. A conveyor as in claim 14 wherein the orientation means comprises a rotating paddle wheel having a periphery from which paddles extend outward.
- [c21] 21. A conveyor as in claim 14 wherein the registration surface comprises a rail including article-engaging rollers that rotate about a vertical axis.
- [c22] 22. A conveyor as in claim 14 wherein the registration surface is parallel to the conveyance direction.
- [c23] 23. A conveyor as in claim 14 further comprising bearing surfaces disposed beneath the conveyor belt and wherein salient portions of the article-supporting rollers extend below the conveyor belt to ride on the bearing surfaces in rolling contact.
- [c24] 24. A conveyor for orienting and registering a conveyed article, the conveyor comprising:
 - an angled-roller-top conveyor belt extending from a first side to a second side and running at a first speed in a conveyance direction along a conveying path and including article-supporting rollers arranged to rotate about roller axes oblique to the conveyance direction;

an orientation belt disposed parallel to the angled-roller-top conveyor belt proximate the second side of the angled-roller-top conveyor belt, the orientation belt running at a second speed opposite the conveyance direction or slower than the first speed in the conveyance direction;

a registration surface disposed at the first side of the angled-roller-top conveyor belt;

wherein the orientation belt engages an article extending past the second side of the angled-roller-top conveyor belt;

wherein the relative motion of the angled-roller-top conveyor belt and the orientation belt causes the article to rotate clockwise toward an alignment of the article in the conveyance direction;

and wherein the angled-roller-top conveyor belt guides the article toward and along the registration surface.

- [c25] 25. A conveyor as in claim 24 wherein the orientation belt includes spaced apart flights that engage the article extending from the angled-roller-top conveyor belt past its second side.
- [c26] 26. A conveyor as in claim 25 wherein the flights are spaced apart a distance less than the major horizontal axis of the conveyed article.

- [c27] 27. A conveyor as in claim 24 wherein the orientation belt includes upstanding members that engage the article extending from the angled-roller-top conveyor belt past its second side.
- [c28] 28. A conveyor as in claim 24 wherein the orientation belt includes a high-friction surface that frictionally engages the article extending from the angled-roller-top conveyor belt past its second side.
- [c29] 29. A conveyor as in claim 24 wherein the orientation belt is substantially coplanar with the angled-roller-top conveyor belt.
- [c30] 30. A conveyor as in claim 24 wherein the orientation belt is disposed in a plane perpendicular to the plane of the angled-roller-top conveyor belt and includes spaced apart flights.
- [c31] 31. A conveyor as in claim 24 wherein the registration surface is parallel to the conveyance direction.